

4I26B MULTI-IO INTERFACE CARD MANUAL

VERSION 1.0

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TABLE OF CONTENTS

HANDLING PRECAUTIONS

Handling precautions	4
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INTRODUCTION

General	5
---------------	---

HARDWARE CONFIGURATION

General	6
Default configuration	6
Serial configuration	8
Serial interrupt options.....	8
Parallel configuration	9
Floppy/IDE configuration	9

I/O CONNECTORS

General	10
Serial port connectors.....	10
Parallel port connector	11
IDE connectors	12
LED connector	12
Power connector.....	12
Floppy connector	12

SOFTWARE CONFIGURATION

General	13
4I26UTIL.....	13

INSTALLATION

General	19
---------------	----

REFERENCE INFORMATION

Specifications.....	20
Warranty.....	21
Schematic diagrams.....	23

HANDLING PRECAUTIONS

STATIC ELECTRICITY

The CMOS integrated circuits on the 4I26 can be damaged by exposure to electrostatic discharges. The following precautions should be taken when handling the 4I26 to prevent possible damage.

- A. Leave the 4I26 in its antistatic bag until needed.
- B. All work should be performed at an antistatic workstation.
- C. Ground equipment into which 4I26 will be installed.
- D. Ground handling personnel with conductive bracelet through 1 megohm resistor to ground.
- E. Avoid wearing synthetic fabrics, particularly Nylon.

INTRODUCTION

GENERAL

The 4I26 is a floppy, IDE, dual serial, and parallel interface card for the PC/104 bus. The 4I26 is intended mainly for development use with MESA PC/104 CPU cards.

The 4I26 IDE interface is fully buffered and has connectors for 3.5" drives (44 pin .1" header) and 2.5" drives (44 pin 2mm header).

The AT compatible floppy interface supports 2 standard 360K, 720K, or 1.44M floppy drives. The 4I26 parallel interface has bidirectional capability. The serial interface is 16C450 compatible with an option for 16C550 type FIFOed UARTS.

The parallel port is capable of bi-directional operation, EPP and ECP modes, and has a bidirectional 16 byte FIFO.

Port locations and enables are determined by hardware jumpers but can be changed by software. Alternate interrupts can be selected for the serial and parallel ports.

HARDWARE CONFIGURATION

GENERAL

The 4I26 has four sets of hardware configuration options: Serial, parallel, floppy/IDE, and serial interrupt. These jumper selectable options determine the power-up configuration of the 4I26. All of these options except the serial interrupt options can be changed later by using the configuration utility, but must be set so that they do not interfere with existing hardware in the system.

The hardware setup will also determine what the BIOS 'sees' at system startup. All options are selected with shorting jumpers placed on three pin headers. In the following discussions, when the words "up" and "down" are used, it is assumed that the 4I26 card is oriented with its bus connectors (J1 and J2) at the bottom edge of the card (nearest the person doing the configuration).

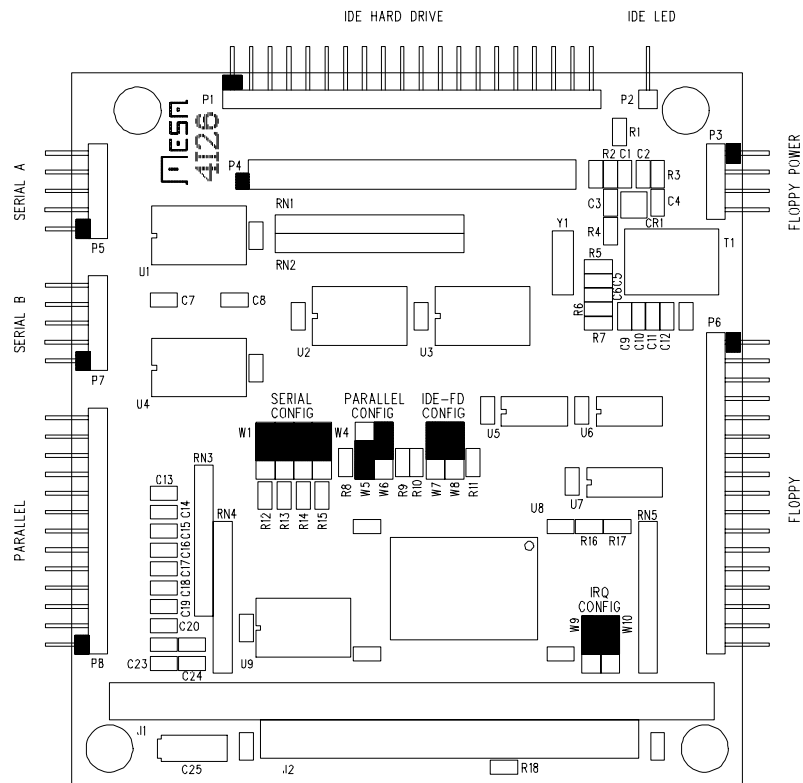
DEFAULT CONFIGURATION

The 4I26 card is configured in the following manner when shipped from the factory.

FUNCTION	JUMPERS	POSITION
SERIAL CONFIG: COM3,COM4, IRQ4,IRQ3	W1-W4	UP,UP,UP,UP
PARALLEL CONFIG: LPT@ 0378H	W5,W6	DOWN,UP
FDC/IDE CONFIG: STD FLOPPY AND IDE ENABLED	W7,W8	UP,UP
INTERRUPT CONFIG: ALTERNATE SERIAL IRQS (10 AND 11)	W9,W10	UP,UP

HARDWARE CONFIGURATION

DEFAULT JUMPER SETTINGS



HARDWARE CONFIGURATION

SERIAL CONFIGURATION

The startup serial port configuration is determined by the settings on jumpers W1 through W4. Since either serial port can be COM1, COM2, COM3, or COM4, the physical ports are referred to as serial A and serial B. Serial A connects to P5 and serial B connects to P7.

W1,W2,W3,W4	SerA add.	IRQ	SerB add.	IRQ
down,down,down,down	disabled	----	disabled	----
down,down,down,up	COM1 - 3F8	4/11	disabled	----
down,down,up,down	COM2 - 2F8	3/10	disabled	----
down,down,up,up	COM3 - 3E8	4/11	disabled	----
down,up,down,down	disabled	----	COM1 - 3F8	4/11
down,up,down,up	disabled	----	COM3 - 3E8	4/11
down,up,up,down	COM2 - 2F8	3/10	COM1 - 3F8	4/11
down,up,up,up	COM3 - 3E8	4/11(S)	COM1 - 3F8	4/11(S)
up,down,down,down	disabled	----	COM2 - 2F8	3/10
up,down,down,up	COM1 - 3F8	4/11	COM2 - 2F8	3/10
up,down,up,down	COM4 - 2E8	3/10	disabled	----
up,down,up,up	COM3 - 3E8	4/11	COM2 - 2F8	3/10
up,up,down,down	disabled	----	COM4 - 2E8	3/10
up,up,down,up	COM1 - 3F8	4/11	COM4 - 2E8	3/10
up,up,up,down	COM2 - 2F8	3/10(S)	COM4 - 2E8	3/10(S)
up,up,up,up	COM3 - 3E8	4/11	COM4 - 2E8	3/10

Note: interrupt selections marked with an (S) are shared between the two serial ports, and require special software in the interrupt service routine to determine the interrupt source.

SERIAL INTERRUPT OPTIONS

The two serial port interrupts can be routed to alternate interrupts if desired. The interrupt called 3/10 in the preceding table can be routed to IRQ3 or IRQ10. This selection is made with W9. When W9 is in the up position, IRQ10 is selected, when down, IRQ3 is selected. Similarly, when W10 is in the up position, the 4/11 interrupt is routed to IRQ11, when down, IRQ4 is selected.

HARDWARE CONFIGURATION

PARALLEL CONFIGURATION

Jumpers W5 and W6 determine the initial parallel port location. Other parallel port options must be set by software.

W5	W6	PORT LOCATION	IRQ
down	down	disabled	-----
down	up	378	IRQ7
up	down	278	IRQ5
up	up	3BC	IRQ7

FLOPPY/IDE CONFIGURATION

Jumpers W7 and W8 determine the initial floppy controller and IDE interface settings.

W7	W8	FLOPPY	IDE
down	down	disabled	disabled
down	up	primary (3F6)	disabled
up	down	secondary (370)	secondary (170)
up	up	primary (3F6)	primary (1F0)

I/O CONNECTORS

GENERAL

The 4I26 connectors are marked with a white square at the pin one end of the connector. When installing cables, this square should be aligned with the colored stripe on the flat cable. Center polarized connectors can be used on the right angle .1" headers if more positive polarization is desired.

SERIAL PORT CONNECTORS

Connectors P5 and P7 are the serial port connectors. These are 10 pin, dual row .1" headers. The suggested mating connector is AMP 499934-1. This is an IDC (flat cable) type connector.

P5 is the primary (SERA) serial port connector, and P7 is the secondary (SERB) serial port connector. These strange serial port names are used because it is possible to re-assign the port addresses with the serial setup jumpers or the setup utility, they are not simply COM1 and COM2.

When the flat cable from P5 or P7 is terminated in a male, 9 pin D subminiature connector, the 9 pin connector will have the same pin-out as IBM AT type 9 pin serial ports. The pin 10 wire from the flat cable must be removed before installing the 9 pin D connector.

P5 and P7 serial port pinouts are as follows:

HEADER PIN	DSUB PIN	SIGNAL	FUNCTION
1	1	DCD	Handshake in
2	6	DSR	Handshake in
3	2	RXD	Data in
4	7	RTS	Handshake out
5	3	TXD	Data out
6	8	CTS	Handshake in
7	4	DTR	Handshake out
8	9	RI	Handshake in
9	5	GND	Signal ground
10	NC	+5V	Power or Key

IO CONNECTORS

PARALLEL PORT CONNECTOR

Connector P8 is the parallel printer port connector. P8 is a 26 pin, dual row .1" header. The suggested mating connector is AMP 746285-6. This is an IDC (flat cable) type connector.

When the flat cable from P8 is terminated in a female, 25 pin D subminiature connector, the 25 pin connector will have the same pin-out as a standard IBM type parallel port. The pin 26 wire from the flat cable must be removed before installing the 25 pin D connector.

P8 parallel port pinout is as follows: (ISA-Standard and PS/2 modes only)

HEADER PIN	DSUB PIN	SIGNAL	FUNCTION
1	1	/PSTB	Strobe (out)
2	14	/PAFD	Auto LF (out)
3	2	/PD0	Data 0
4	15	/PERROR	Printer error (in)
5	3	PD1	Data 1
6	16	/PINIT	Reset printer (out)
7	4	PD2	Data 2
8	17	/PSLIN	Select printer (out)
9	5	PD3	Data 3
10	18	GND	Ground
11	6	PD4	Data 4
12	19	GND	Ground
13	7	PD5	Data 5
14	20	GND	Ground
15	8	PD6	Data 6
16	21	GND	Ground
17	9	PD7	Data 7
18	22	GND	Ground
19	10	/PACK	Printer Ack (in)
20	23	GND	Ground
21	11	PBUSY	Data in (in)
22	24	GND	Ground
23	12	PPE	Paper out (in)
24	25	GND	Ground
25	13	PSLCT	Printer selected (in)
26	NC	+5V	Key

I/O CONNECTORS

IDE CONNECTORS

The 4I26 has both .1" 40 pin and 2mm 44 pin IDE drive connectors. These connectors are labeled P1 and P4. The 2MM connector is for use with 2.5" drives. The 2mm connector supplies power to the drive, so when 2.5" drives are used, no additional power cable is needed. Pin 20 is removed from both connectors to prevent backwards cable installation.

It is suggested that minimum IDE cable lengths be used, as there is no error checking on the IDE cable, the IDE interface is not terminated, and long cables are known to cause problems with *any* IDE controller / drive combination. A maximum cable length of 18" is reasonable.

LED CONNECTOR

Two pin connector P2 can drive a disk activity LED. Pin one (the upper pin) connects to the LED cathode.

POWER CONNECTOR

A 4 pin inline connector is available to supply 5V power to hard or floppy drives. This connector is labeled P3. 12V power is not available at P2.

The suggested mating connector is AMP MTA type connector 641190-4 (non-feedthrough) or 641198 (feedthrough). The pinout is compatible with 5V only 3.5" floppy drive power connectors.

Power connector pinout is as follows:

PIN	SIGNAL	CURRENT RATING
1	+5V	1A
2	GND	1A
3	GND	1A
4	NC	XX

FLOPPY CONNECTOR

Connector P6 is the floppy connector. P6 is a 34 pin, dual row .1" header. The 4I26 uses standard PC type floppy cables (with the twist in the cable for drive A:)

Make sure that you have the pin one end of the cable (usually marked with a colored stripe) oriented towards pin one on P6. If the cable is installed backwards, you will destroy any information on diskettes inserted into the floppy drive.

The floppy controller chips used on the 4I26 have protection diodes built into all I/O pins. These diodes can cause a problem if a floppy drive is powered by a different power supply than the 4I26. The problem occurs if the 4I26 power is removed when the floppy power is still on. In this case, the protection diodes pull down the floppy interface lines, including drive select and write gate. If you have a separate floppy power supply, make sure to open the floppy door before powering down.

SOFTWARE CONFIGURATION

GENERAL

The 4I26 has many setup options that can be programmed after the system has started up. A much wider range of options is available with this software setup than can be selected by the jumpers. These settings are volatile, and will revert to the jumper selected default settings at power up or hardware reset. If you need to select an option that can not be selected via jumpers, a setup utility program is supplied. The setup utility can be run as part of your AUTOEXEC.BAT file.

4I26UTIL

4I26UTIL is a utility program for reading and setting 4I26 options. 4I26UTIL is invoked with two command line parameters, a **function code** and a **configuration file name** or **group name**. The function code can be either S for Set or R for Read:

4I26UTIL S STANDARD.CFG	(To set 4I26 parameters) (with parameters in STANDARD.CFG)
4I26UTIL R [GROUP]	(To read 4I26 parameters) (optional group limits printed data)
4I26UTIL R >MYOWN.CFG	(To save current 4I26 parameters in file)

When S is specified, 4I26UTIL changes the current 4I26 settings to those specified in a configuration file. When R is used, 4I26UTIL prints out the current 4I26 configuration. The output of 4I26UTIL can be re-directed to a file to save the current setup options.

The configuration file is an ASCII file containing the configuration parameters. The 4I26 distribution disk has two example configuration files, COM5COM6.CFG and STANDARD.CFG. You can use these files as a starting point to creating your own configuration files. The format of the configuration file is very simple: each line of the configuration file consists of a parameter name followed by a parameter value. If a parameter name is not specified in the configuration file, that parameter will not be changed. Any line starting with a semicolon is regarded as a comment.

The parameter names, and parameter values are as follows:

The Clock-Off parameter can be used to disable the clock to all serial, parallel, and floppy I/O logic to save power. Enabling this option will disable the 4I26 card.

PARAMETER	PARAMETER VALUES
Clock-Off	No (default) Yes

SOFTWARE CONFIGURATION

4I26UTIL

The FDC-Enable option can be used to change the floppy controller enable status from the hardware configured status. The default setting of this parameter is determined by the floppy/IDE configuration jumpers.

PARAMETER	PARAMETER VALUES
FDC-Enable	Yes No

The floppy controller on the 4I26 can be set to the Primary address (3F0-3F7) or an alternate (Secondary) address (370 -377). The default setting of this parameter is determined by the floppy/IDE configuration jumpers.

FDC-Address	Primary Secondary
-------------	----------------------

The floppy logic can be turned off if not used, to conserve power. This is done with FDC-Direct-Powerdown.

FDC-Direct-Powerdown	No Yes	(default)
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The floppy logic can be programmed to automatically power-down when not used. This is done with FDC-Auto-Powerdown.

FDC-Auto-Powerdown	No Yes	(default)
--------------------	-----------	-----------

The parallel port can be enableed or disabled with this parameter. The default setting of this parameter is determined by the parallel configuration jumpers.

PP-Enable	Yes No
-----------	-----------

The PP-Address parameter selects the location of the parallel port. The default setting of this parameter is determined by the parallel configuration jumpers.

PP-Address	378 278 3BC
------------	-------------------

SOFTWARE CONFIGURATION

4I26UTIL

The PP-Mode parameter selects the basic operating mode of the parallel port. The default power up state is ISA-Compatible. This is the standard output only printer port mode. The PS/2-Compatible mode is the simple bidirectional mode. When set to the PS/2-Compatible mode, bit 5 of the printer control port determines the signal direction on the printer data lines. A low on bit 5 sets the lines to the output direction, a high on bit 5 sets the data lines to the input direction.

The EPP mode is a more sophisticated bi-directional configuration designed for interfacing with parallel port peripherals. The EPP mode has hardware handshaking to improve data transfer rates.. The ECP is another sophisticated bidirectional mode that includes a 16 byte FIFO to further improve transfer rates. The ECP mode cannot be selected with the setup utility, but is enabled by a ECP aware driver.

PARAMETER	PARAMETER VALUES
PP-Mode	ISA-Compatible (default) PS/2-Compatible EPP ECP

The PP-FIFO-Threshold parameter determines how many data bytes must be in the parallel port FIFO to cause an interrupt. This parameter only affects the ECP parallel port mode. When set for 1-FOR-15-REV, interrupts will be generated once per output byte (like a standard parallel port) but only when 15 input bytes have been received. When set for 8-FOR-8-REV, interrupts will be generated when 8 bytes have been received or 8 bytes locations are available for output.

PP-FIFO-Threshold	1-For-15-Rev 8-For-8-Rev
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The PP-Direct-Powerdown parameter allows the parallel port to be powered down when not used.

PP-Direct-Powerdown	No (default) Yes
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The parallel port logic can be programmed to automatically power-down when not used. this is done with PP-Auto-Powerdown.

PP-Auto-Powerdown	No (default) Yes
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SOFTWARE CONFIGURATION

4I26UTIL

Serial-A-Enable allows serial port A to be turned off if not used, freeing its I/O space and interrupt. The default setting of this parameter is determined by the serial configuration jumpers.

PARAMETER	PARAMETER VALUES
Serial-A-Enable	Yes No

The serial A port can be set to eight different addresses. The default setting of this parameter is determined by the serial configuration jumpers.

Serial-A-Address	3F8 2F8 220 228 238 2E8 338 3E8
------------------	--

The serial A ports interrupt can be routed to IRQ3/10 or IRQ 4/11. The 3 - 10 or 4 - 11 selection is done with the IRQ configuration jumpers. The default setting of this parameter is determined by the serial configuration jumpers.

Serial-A-Irq	IRQ3/10 IRQ4/11
--------------	--------------------

The serial A port can use the standard 1.84 MHz baud rate clock or a 2 MHz clock necessary to generate the MIDI baud rate.

Serial-A-Clock	Standard MIDI
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SOFTWARE CONFIGURATION

4I26UTIL

The Serial-A-Direct-Powerdown parameter allows the serial A port to be powered down when not used.

PARAMETER	PARAMETER VALUES	
Serial-A-Direct-PowerDown	No	(default)
	Yes	

The serial A port logic can be programmed to automatically power-down when not used. this is done with Serial-Auto-Powerdown

Serial-A-Auto-PowerDown	No	(default)
	Yes	

Serial-B-Enable allows serial port B to be turned off if not used, freeing its I/O space and interrupt. The default setting of this parameter is determined by the serial configuration jumpers.

Serial-B-Enable	Yes
	No

The serial B port can be set to eight different addresses. The default setting of this parameter is determined by the serial configuration jumpers.

Serial-B-Address	3F8
	2F8
	220
	228
	238
	2E8
	338
	3E8

The serial B ports interrupt can be routed to IRQ3/10 or IRQ 4/11. The 3 - 10 or 4 - 11 selection is done with the IRQ configuration jumpers. The default setting of this parameter is determined by the serial configuration jumpers.

Serial-B-Irq	IRQ3/10
	IRQ4/11

SOFTWARE CONFIGURATION

4I26UTIL

The serial B port can use the standard 1.84 MHz baud rate clock or a 2 MHz clock necessary to generate the MIDI baud rate.

PARAMETER	PARAMETER VALUES
Serial-B-Clock	Standard MIDI

The Serial-B-Direct-Powerdown parameter allows the serial B port to be powered down when not used.

Serial-B-Direct-PowerDown	No Yes	(default)
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The serial B port logic can be programmed to automatically power-down when not used. This is done with Serial-Auto-Powerdown

Serial-B-Auto-PowerDown	No Yes	(default)
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IDE-Enable allows the IDE interface to be turned off if not used, freeing the I/O space occupied by the hard drive (1F0-1F7 or 170-17F hex). The default setting of this parameter is determined by the IDE/Floppy configuration jumpers.

IDE-Enable	Yes No
------------	-----------

The IDE decode address can be set to the primary IDE address (1F0-1FF) or the secondary IDE address (170 -17F). Note that this is different from the master/slave drive setup. The default setting of this parameter is determined by the IDE/Floppy configuration jumpers.

IDE-Address	Primary Secondary
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INSTALLATION

GENERAL

When the 4I26 has been properly configured for its application, it can be inserted into a PC/104 stack. The standoffs should then be tightened to secure the 4I26 in its place. The 2mm IDE connector is much easier to install from the top, so if you are using this connector, you should either install the cable before assembling the 4I26 into the PC/104 stack or leave the 4I26 on the top of the stack. When the 4I26 is secured in the stack the other I/O connectors can be plugged in from the side.

REFERENCE INFORMATION

SPECIFICATIONS

	MIN	MAX	UNIT	NOTES
POWER SUPPLY				
Voltage	4.5	5.5	V	
Supply current (5V)	---	125	mA	
BUS LOADING:				
Input capacitance	---	15	pF	
Input leakage current	---	5	uA	
Output drive capability	150	---	pF	
Output sink current	12	---	mA	
ENVIRONMENTAL:				
Operating temperature range				
-I version	-40	+85	°C	
-C version	0	+70	°C	
Relative humidity	0	90	Percent	
			Non-condensing	

REFERENCE INFORMATION

WARRANTY

Mesa Electronics warrants the products it manufactures to be free effects in material and workmanship under normal use and service for the period of 2 years from date of purchase. This warranty shall not apply to products which have been subject to misuse, neglect, accident, or abnormal conditions of operation.

In the event of failure of a product covered by this warranty, Mesa Electronics, will repair any product returned to Mesa Electronics within 2 years of original purchase, provided the warrantor's examination discloses to its satisfaction that the product was defective. The warrantor may at its option, replace the product in lieu of repair.

With regard to any product returned within 2 years of purchase, said repairs or replacement will be made without charge. If the failure has been caused by misuse, neglect, accident, or abnormal conditions of operation, repairs will be billed at a nominal cost.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. MESA ELECTRONICS SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT, OR OTHERWISE.
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If any failure occurs, the following steps should be taken:

1. Notify Mesa Electronics, giving full details of the difficulty. On receipt of this information, service data, or shipping instructions will be forwarded to you.
2. On receipt of the shipping instructions, forward the product, in its original protective packaging, transportation prepaid to Mesa Electronics. Repairs will be made at Mesa Electronics and the product returned transportation prepaid.

REFERENCE INFORMATION

REFERENCE INFORMATION

SCHEMATICS